



***Lakaki* as a form of curriculum adaptation for learning electrical circuits material for the 6th grade students of elementary school**

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Abstract

Science learning in elementary schools is influenced by, among other things, interactive learning experiences. Interactive learning involves the activities of all students with various characteristics. An interactive learning experience will support the successful learning outcomes of all students. In reality, teachers face a diversity of student characteristics, one of which is related to different cognitive abilities. The aim of this research is to determine the success of the learning outcomes of all students through the *Lakaki* "Lamp Our Cafe" Project. This research is a classroom action research (CAR) model by Kemmis & Mc. Taggart is carried out in two planned cycles. The stages include planning, action, observation and reflection. The subjects in this research were the sixth grade students at one of the state elementary schools in Sleman. The research was carried out by providing action in the form of a project to make decorative lamps using residual items found in the surrounding environment. The implementation of the *Lakaki* project carried out observations, interviews and documentation of student learning outcomes. The *Lakaki* (Lampu Kafe Kita/Our Cafe Lights) project steps include: orienting students to problems, organizing students to learn, guiding individual/group investigations, developing and presenting results, analyzing and evaluating the problem solving process carried out in blended learning. The results of the research showed that there was an increase in student learning outcomes from cycle 1 with method completeness of 57.15% and a class average of 72.00. Cycle 2 learning completion reached 100%, with an average final score of 94.18. This proves that the *Lakaki* project is an alternative learning method to meet the diversity of students, especially the diversity of different cognitive abilities.

Keywords: Curriculum adaptation, Electrical Circuits, *Lakaki*, Science

INTRODUCTION

Learning developed by teachers in the classroom must be responsive to the diversity or diversity of students in each class. Interactive learning involves the activities of all students with various characteristics. An interactive learning experience will support the successful learning outcomes of all students (Budiningsih, 2015).

The plurality of student characteristics must be understood by every educator in order to be successful in learning. Diversity in the classroom is not only in the form of diversity in gender, physical, and socio-economic background of students. Intellectual diversity, learning styles, interests or interests in learning, and learning modalities are also often faced by educators. Various ways are needed to develop learning that is designed

based on the abilities and characteristics of students. Teachers also need to pay attention to socio-cultural background because each child has their own uniqueness, abilities and capacities (Andini et al., 2020; Budiningsih, 2015; Gómez-Zepeda et al., 2017). Likewise with the teachings of Ki Hadjar Dewantara, who said that every child has their own nature and unique and different characteristics (Wardani, 2015; Wijastuti et al., 2020).

Educators must be able to build and develop what is within children according to their natural nature, including their talents and abilities. Educators must strive for learning that liberates children physically and mentally so that children do not feel restrained both physically and spiritually. This is the basis for the need to balance cognitive, affective and

psychomotor aspects in achieving daily learning goals.

There are several factors that determine the achievement of learning goals in elementary school, including interactive learning experiences and learning facilities that support the learning process (Firman in Wijoyono, H. 2021). The learning experience must be experienced by all students, without distinguishing between various cognitive abilities or conditions of students. This encourages teachers to present learning using multi-methods, multi-source learning in various (differentiated) processes. The presence of students with special needs (ABK) in the classroom is a form of diversity and teacher acceptance in educating and teaching all children.

Ideally, in order to develop and create a good learning experience, each teacher must be able to pay attention to the characteristics of the students in their class (Wijiastuti et al., 2020).

One of the important things that must be considered is the accessibility or convenience available to all students, so that a diversity of characteristics, including a diversity of abilities, can learn together with other friends. These are the basic principles that must be developed and then applied in realizing inclusive education by upholding fair equality, inviting all students to participate actively and providing opportunities for all to achieve their potential (Andini, 2014; Lisdiana et al., 2019; Salamanca, 1994; Sunanto, 2016; Tomlinson, 2000).

Teachers as educators have the freedom to design each lesson, taking into account the existence of children with existing specialties. Teachers can involve and integrate all children in learning. Joint activities in learning projects will not only help in understanding the material, but will encourage the creation of children's social emotional understanding. Teachers can also optimize the presence and abilities of all students to create interactive and meaningful learning through group activities.

Carrying out learning innovation as a step to provide accommodation for learning is very important, so the role of teachers in

developing learning that is able to generate interest, curiosity, critical thinking skills and active communication and interaction involvement is very necessary (Blaine, 2019).

The various characteristics that emerge require various alternative methods and the development of innovative learning methods and media that are able to meet the different learning needs of all students. To fulfill this, teachers need creativity and confidence in doing something, in this case creating a learning innovation (Gheysens et al., 2021; Henry & Namhla, 2020; Scherer et al., 2021).

Natural Sciences (IPA), which is taught from elementary school level, is the result of human activities in the form of organized knowledge, ideas and concepts about the natural environment, which are obtained from experience through a series of scientific processes, including through the process of investigating, compiling and testing ideas (Irfan, 2020).

Science learning can be done with various media, various learning models. Where a teacher can design and implement appropriate learning methods for all his students. The various characteristics that emerge require various alternative methods and the development of innovative learning methods and media that are able to meet the different learning needs of all children. To fulfill this, teachers need creativity and confidence in doing something, in this case creating a learning innovation. One of the materials studied in science in grade VI elementary school in the odd semester is electrical circuits. In KD 3.4: identify electrical components and their functions in simple electrical circuits, and KD 4.4: Conduct experiments on simple electrical circuits in series and parallel. The competency expected in this competency is that cognitively students must be able to explain electrical circuits, recognize the components of electrical circuits and also differentiate between series and parallel electrical circuits. Apart from understanding these concepts, students must also be able to implement the knowledge they gain in everyday life.

In this research, all students are invited to carry out work/projects together to understand and implement them in everyday life by using the objects around them.

The choice of the *Lakaki (Lampu Kafe Kita/Our Cafe Lights)* project is a form of modification and learning accommodation for students with special needs so that they can study together with friends in their class without being differentiated in a pleasant atmosphere. Learning modification itself is an adjustment to learning outcomes based on children's abilities and learning accommodations are an alternative way so that every child can learn together and participate actively in learning (Andini et al., 2020).

In this research, the *Lakaki (Lampu Kafe Kita/Our Cafe Lights)* project is a form of learning accommodation which is an acronym for *Lampu Kafe Kita/Our Cafe Lights*. The aim of this research is to determine whether there is an increase in science learning outcomes regarding electrical circuits for all students with diverse abilities in grade VI. Learning modification here is intended to adjust student learning outcomes by considering aspects of learning style, interest in learning and use of technology.

METHODS

The method used in this research is Classroom Action Research model Kemmis & Mc. Taggart with 2 cycle planning. This research involved one large group which was then divided into several small groups. The research subjects were all sixth grade students at State Elementary Schools in Sleman Regency with a total of 28 students, 11 boys and 17 girls. Of the 28 children, there were 25 regular children and 3 children identified as having special needs. Types of special needs are slow learners and mild mental retardation.

Research data was obtained from observations, interviews, and documentation studies of students' final learning assessment results. The implementation technique in this research is to provide action in the form of creating the *Lakaki (Lampu Kafe Kita/Our Cafe Lights)* project, which is carried out in

groups by mixing all the children, and giving each child the freedom to choose group members according to the agreed number and group leader. During and after project activities, observations and measurements of student learning outcomes were carried out. Student learning outcomes are measured after learning is completed.

Observations are carried out by observing attitudes and skills. Observations were carried out by researchers with the help of a colleague. This observation aims to get an overview of learning, especially students' attitudes and behavior during the learning process. Behavior observed during learning using a checklist. Aspects observed during learning include attitudes of responsibility, self-confidence and collaborative/caring.

Student skills were measured using an observation rubric on videos of students' group learning results in making decorative lamps using a series of series. Groups of students (4-5 children) were asked to make a series electrical circuit in the form of a simple flashlight in cycle 1, groups of students (2-3) made a series electric circuit in the form of cafe lights in cycle 2. The video was made by a group of students (2-3 people) using carry out the activity of making decorative lamps using materials available around the students, then compose a short video and send it to the class Study Group which can be accessed by all students of grade VI.

The ability to cooperate/collaborate, communication skills and creativity are also observed in learning. The results of measuring students' skills were carried out by viewing videos submitted by groups containing student learning outcomes in the form of a series of lights that could be lit. This assessment uses a rubric. In the end, both attitude values, knowledge values and skills values are used to determine the development of the learning process.

The interview technique used in this research was written, namely about testimonials from students in carrying out the *Lakaki* project activities. The results of the interview activities were used to support the

final research conclusions. The interview was held on September 29, 2023.

RESULTS AND DISCUSSION

Lakaki (Lampu Kafe Kita/Our Cafe Lights) is a science learning project implemented in the classroom by prioritizing collaborative learning. This project is expected to make it easier for students to understand simple electrical circuit material, namely series and parallel electrical circuits, KD 3.4 and 4.4. This project is also intended as a form of learning accommodation for students, including students with special needs. Learning preparation for carrying out this project involves teachers, fellow teachers, and students. The teacher creates a Learning Implementation Plan (Rencana Pelaksanaan Pembelajaran/RPP) which has been adapted to the learning characteristics of the students.

The learning characteristics of class VI students at State Elementary Schools in Sleman Regency include:

1. Learning style, based on an assessment carried out by the teacher at the beginning of the learning year for 28 students. Data was obtained that the majority of students have a kinesthetic learning style (54%). A number of children have a visual learning style (32%) and some children have an audio learning style (14%)

2. Interest in learning, based on the results of an assessment of interest in learning for 28 children, data was obtained that the majority of students had a high interest in science subjects.

Based on the learning styles and learning interests of the students, the teacher designs learning that can accommodate the learning needs of all students. The choice of the *Lakaki* Project in science learning is intended to provide learning accommodations for students who like kinesthetic, visual and audio learning styles. The selection of projects is also intended to facilitate students' interest in science subjects and develop cooperative learning.

The *Lakaki* (Lampu Kafe Kita/Our Cafe Lights) project began with teachers and students brainstorming ideas about developing

a coffee shop (cafe) around where the students lived. The class discussion developed by discovering the positive and negative impacts of the many existing cafes. One of them is the presence of residue/remnants from use of glasses/drinking utensils which become rubbish around them (student orientation to the problem). The teacher then facilitates all students to group together and present examples of simple electrical circuits in class (organizing students to learn). During experimental activities, the teacher guides the implementation of individual/group investigations by providing examples and mentoring to groups in the class. Groups are given the opportunity to try making a simple electrical circuit, in the form of making a flashlight (develop and present the results). Next, there is appreciation and criticism of the work carried out by the group. (analyzing and evaluating the problem solving process).

This science content learning is documented as follows:

1. Cycle 1. Learning electric series circuits in class



Gambar 1
Learning electric series circuits in class

Tabel 1
Analysis of the Value of KD 3.4 and 4.4
Science Learning
Class VI Students of State Elementary
Schools in Sleman Regency
Academic Year 2023/2024

o	Nilai KKM	Peserta Didik	Siklus 1					TAMPILAN VIDEO KELOMPOK
			Banyaknya peserta didik	Sudah tuntas	Belum tuntas	Perolehan nilai Unjuk kerja (rata-rata)	Persentase Ketuntasan (%)	
1	75	ABK	3	3	-	52,00	0%	BAIK
2		Reguler	25	25	-	74,56	64%	BAIK
Jumlah/Rata-rata Kelas			28	28	-	72,00	57,14%	BAIK

Based on the final assessment of KD 3.4 and 4.4 learning, it was found that the class learning completeness data was 57.14% with the average final score of KD 3.4 achieved by regular students being 74.56 and the average achievement by ABK 52.00 with a class average of 72.00. This proves that the learning of electrical circuit material has not been completely successful. Based on the results of the learning reflection, it was found that this was due to the lack of learning opportunities at school and the limited electrical tools provided to groups so that not all students could practice on their own.

From the results of the learning reflection, the researcher redesigned the learning by optimizing the role of the group. Workgroups consist of 2-3 children. This group has the task of completing decorative lamp/cafe lamp products according to children's creativity, using residual objects from drink packaging that are easy for children to obtain, with a task completion time of 4 days and documentation of the task and work 1 day. Students are given the freedom to determine partners/groups to do assignments based on proximity to where they live.

2. Cycle 2. Learning electric series circuits in class.

The results of implementing the cycle 2 learning project are as follows:

Documentation of the results of making an electrical circuit in Cycle 2



Gambar 2
Making an electrical circuit in Cycle 2

The learning outcomes in cycle 2 can be explained in the following table:

Tabel 1
Analysis of the Value of KD 3.4 and 4.4
Science Learning
Class VI Students of State Elementary
Schools in Sleman Regency
Academic Year 2023/2024

No	Nilai KKM	Peserta Didik	Siklus 2				TAMPILAN VIDEO KELOMPOK	
			Banyaknya peserta didik	Sudah tuntas	Belum tuntas	Perolehan nilai Unjuk kerja (rata-rata)		Persentase Ketuntasan (%)
1	75	ABK	3	3	-	83,33	100%	SANGAT BAIK
2		Reguler	25	25	-	95,48	100%	SANGAT BAIK
Jumlah/Rata-rata Kelas			28	28	-	94,18	100%	SANGAT BAIK

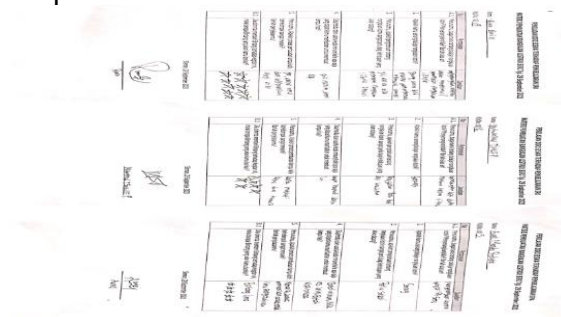
Based on the final assessment of KD 3.4 and 4.4 learning, it was found that class learning completeness data was 100% with the average achievement of the final score of KD 3.4 by regular students being 95.48 and the average achievement by ABK being 83.33 with a class average of 94.18. Based on the observation data, it was found that the students showed a cooperative attitude, which was suspected by helping each other in the preparation, implementation and compilation of the video. The students presented their work happily.

The success of Cycle 2 learning is supported by the use of a cooperative approach and using a variety of methods, which can help all children achieve their achievements (Mariappan, P., Khairani, M. Z., & Chanthiran, 2022). Regular students and students with special needs mingle, communicate actively and complement each other.

This collaborative attitude of students is a good thing for the success of subsequent learning. The development of creative-innovative attitudes is also demonstrated by students in groups. In the process of presenting the results of the project to make cafe lights, student groups are given the freedom to use a suitable video editing application. This shows that students are able to apply digital technology in this learning. In this technological era, an educational transformation is needed with various alternatives that focus on management and learning (Hulukati & Djibrin, 2022).

The development of students' self-confidence can be seen from the activity of presenting work results in short videos. Students try to do it themselves, and find understanding of the material provided by the teacher. With guidance from friends who understand better, students who were initially shy and hesitant become more enthusiastic in working. This confident attitude is what students need to be more active in learning and develop their talents, potential and creativity.

The success of learning with the Lakaki Project is also supported by the results of written interviews/testimonials from students. As presented below:



The active role of students' parents supports the success of learning in this Lakaki project. Parents are very supportive and facilitate group activities. Together, parents help provide materials for making lamps, so that there is a synergy between teachers, students and parents, able to minimize obstacles in learning science in the classroom.

CONCLUSIONS

The diversity of characteristics of students in the class encourages efforts to

design and develop learning that focuses on management and learning itself. This will create learning that is able to invite all students to participate actively and achieve their respective learning potential.

The *Lakaki* (Lampu Kafe Kita/Our Cafe Lights) project has proven to be an alternative in meeting the diversity of students and helping all children understand the material. Moreover, in dynamic and complex science learning, concrete methods are needed that can help each child understand the concepts of the material and implement them in everyday life.

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